PMA 99-0190

TURKEY PEST MANAGEMENT EVALUATION

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PREPARED FOR California Department of Pesticide Regulation

March 8, 2000

DISCLAIMER

The statements and conclusions in this report are those of the contractor and not necessarily those of the California Department of Pesticide Regulation. The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as actual or implied endorsement of such products.

Acknowledgments

The PMA for Turkeys was an outgrowth of the our original PMA program on fryers. Mr. Bill Mattos and Mr. Mark Looker with CPF worked with AgriLynx to coordinate the communications, write a cover letter describing the effort and mail some of the surveys.

Mr. Charlie Hunter with DPR and Dr. Nancy Hinkle made many helpful suggestions on how to the design of the survey and the presentation of information.

Both company owned farms and independent contractors were represented in this survey and were extremely helpful and supportive in our efforts to understand their pest issues, methods of managing these pests and their use of pesticides or alternative techniques.

We believe that this Turkey Pest Management Alliance has progressed the interest in poultry IPM and created a positive working environment with parties of different areas of expertise who are focused on working with the industry end user. The continued alliance of a central statewide organization (CPF) who could mobilize interest and give credibility to this type of survey with technical experts involved at the field level and the regulatory agency participants has resulted in a long term relationship that will enable us to meet the future pest management needs of this industry.

Finally, this effort was conducted during a very short period of time and would not have been possible without the people who shepherded this survey through their organizations. We would like to recognize Mr. Ray Romero with Foster Farms, Ms. Teri Scarabello with Zacky Farms, Mr. Evans Keller with Pitman, Mr. Yan Ghazakanian with Nicholas and SunUp farms . It has been a pleasure and a privilege to have had the opportunity to interact with all those involved.

Leslie A. Hickle, Ph.D.
Turkey Pest Management Alliance Coordinator

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ABSTRACT

The pest management evaluation on turkeys was undertaken to provide insight into the pest issues facing the producers in this industry. The intent was to understand the pest management complexes, the current methods of controlling pests and the economic impact that various regulatory legislation would have on this group. The survey results are based on input of companies and independent contractors that produce greater than 95% of turkeys in the state. Survey results indicate that flies and mice are the most important pests encountered on farms. Our industry also used products that are under FQPA review such as carbamate-based fly baits and organophosphate fly baits. Since rodents are a concern due to disease issues, rodenticides are also important management tools; however, lack of performance and potential nontarget effects on endangered species will impact their future use. Alternative methods to reduce the use of these pesticides are available for implementation through either demonstration, further evaluation and education/outreach.

I. BACKGROUND INFORMATION TURKEY PRODUCTION

California's turkey industry ranked 6th in the nation producing 19 million head (USDA Poultry Production and Value, 1998 Summary, April 1999). This represents 442,700 million pounds which goes into both fresh market, frozen and post processed foods. The average price per pound returned to producers was $0.41/pound (live weight) and the value of production was $181,507,000. Turkeys production is concentrated in the San Joaquin Valley of California. There are still a few small operations in Sonoma county however, the largest turkey companies based in the central valley represent >95% of the state's production. The state's ~18 million turkeys are raised on farms with multiple housing structures. Nuances in husbandry and length of time to reach market size affect the turnaround time in these houses; however, both operations experience the same pest pressure. The poultry houses have between 16,000-40,000 square feet of growing area and are actually hollow shells with open-sided (covered with bird wire) side walls where the temperature and ventilation can be managed through raising and lowering curtains which are strung the length of outside of the house. Turkeys have two stage production in that the poults(baby turkeys) are grown in one house and moved at ~ 5 weeks of age to another house that is usually on the same farm. They remain in these grow houses for an additional 15 weeks (more or less), depending on the sex and size of bird the company is growing. The birds are vaccinated for diseases both at the hatchery and in the field. Turkey houses usually have ~3 turns/year. Each house is cleaned and disinfected between flocks and the litter base which consists of either pine shavings or rice hulls is either replaced completely or reconditioned by decrusting the top and sometimes adding some new bedding. Old litter is completely removed between one to three times per year in turkey houses in a process called a cleanout. Turkeys are grown to different weights for processing and are ~21 weeks of age at processing. There is usually ~2-3 weeks before the next flock is introduced. The number of houses on turkey farms is variable. Turkey farms are much smaller than fryer farm and have between 4 and 8 buildings; however, some farms in California have >20 houses. The two largest companies in California, Foster Farms (they purchased Butterball) and Zacky Farms own some farms directly and are the two largest turkey producers. The largest pecentage of production is primarily through independent contract growers. A much smaller but highly valuable side of this industry are the breeders or multipliers which are the source of eggs for the production end of the business. Breeder farm flocks remain in buildings which outwardly may look similar to commercial houses but have modified interiors to accommodate the pens for mature toms and the hen's nest boxes. The birds are segregated and all turkey reproduction is through artificial insemination. Breeding flocks remain in these structures for much longer periods of time (~59 weeks). The construction and style of poultry house, on farm sanitation, cleanout schedule, and vegetation management all impact pest management successes on these farms.

II. THE PEST MANAGEMENT EVALUATION SURVEY

Our survey was designed with two objectives in mind: to obtain a high percentage response and to follow-up with 100% of the respondents regarding questions we had in addition to those listed in the survey. This would ensure that the information obtained was of high quality and accuracy. Our two page survey was developed through input from DPR and UC Cooperative Extension. CPF put the cover letter and survey together and mailed out several to producers. Dr. Hickle met with the major companies to discuss and deliver the surveys. We received a total of 48 completed survey out of a total of 55 (87%) potential industry producers . These represent the major companies and their independent contract growers. The cover letter and survey form is attached as Exhibit 1.

III. PEST COMPLEXES ON TURKEY FARMS

Turkeys have the same pests regardless of region. These are house mice (*Mus musculus*), Norway rat (*Rattus norvegicus*), roof rat (*Rattus rattus*), California ground squirrels (*Spermophilus beecheyi*) house flies (*Musca domestica*), darkling beetles (*Alphitobius diaperinus*), weeds, wild birds (house sparrows), and other pests such as skunks and weasels.

The rodents cause damage to buildings, kill baby chicks and poults (Norway rats), eat feed and carry disease and parasites affecting flock health. They are generally more of a problem on farms with poor vegetation (=weed) management and in houses with anterooms or insulation. House mice and Norway rats have multiple generations and will set up housekeeping on farms readily. They may number in the hundreds to thousands on a farm and are seasonal in their movement: spring and fall are notorious for rodent invasions due to weather changes or disturbance of the adjacent fields. Squirrels are worse on farms near orchards or poorly maintained hillsides. They undermine cement foundations around the houses and feed bins.

House flies may be problems from early summer through late fall. They are much worse in turkeys than in fryers because of the suitable breeding conditions and long relatively undisturbed growout period. Turkey litter is perfect harborage and development sites for the maggots. These insects are of concern due to their ability to vector human and poultry pathogens as well as their ability to cause public nuisance complaints regarding the farm.

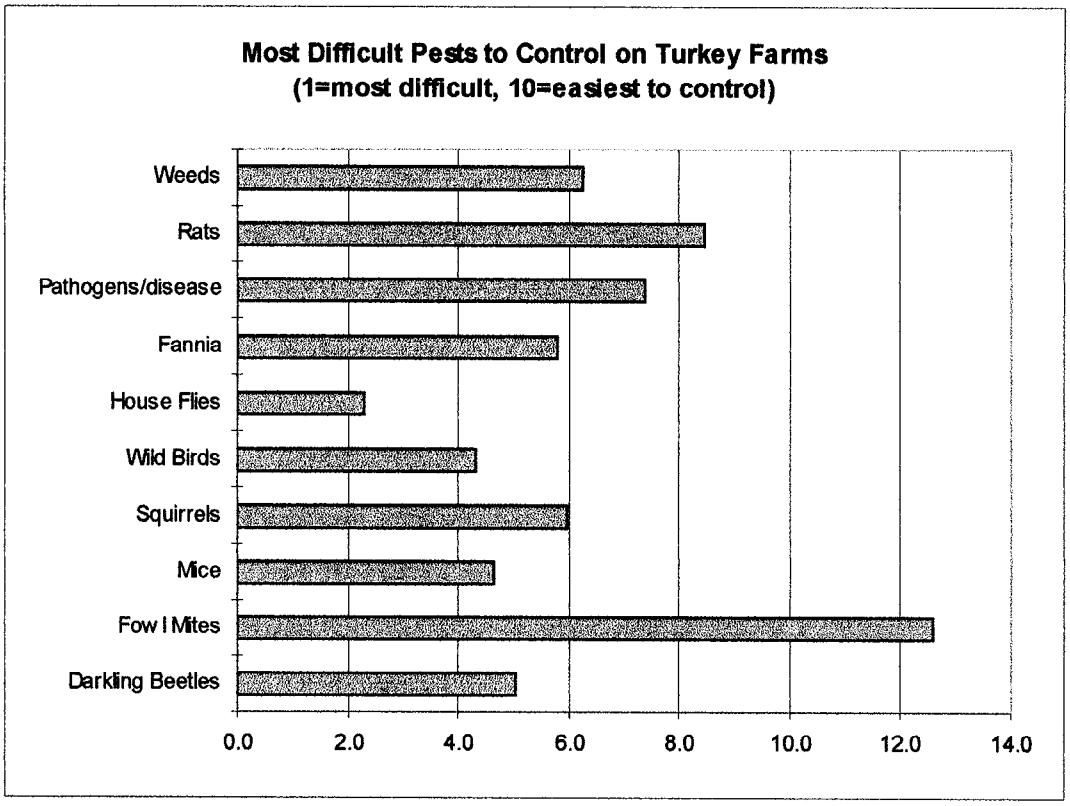
The tenebrionid beetle known as the darkling beetle used to be of more importance to this industry. With the advent of Tempo (cyfluthrin) insecticide, beetle populations in these houses have been greatly reduced. All stages of the insect are found in the litter and sometimes just outside the perimeter of the house. It is known to carry at least 23 different pathogens, is an intermediate host for poultry tape worms and can become a public nuisance when it flies to adjacent neighbors from manure/litter spread in fields. The reduction in darkling beetle populations have aggravated house fly populations in that the beetles occupy the same niche and are normally predaceous on fly eggs and maggots.

Sanitation on farm includes weed or vegetation management. Poor attention to this facet of farm maintenance usually results in elevated rodent, fly and sometimes wild bird pest problems. The weeds provide harborage for rats and mice and if producers only bait or treat their houses, they will not eliminate their rodent problem.

Sparrows are the most common wild birds found in poultry houses, however, it is not uncommon to find woodpeckers, starlings, and crows.

Skunks tend to be transient visitors to farms and may raid eggs or kill babies. If left untreated, they will nest on the farm and produce more skunks..

We asked producers two questions regarding their pests: 1) which pests were the most difficult to control and 2) which pests caused the most economic damage (as defined through flock health effects, public nuisance complaints, building damage, etc.). The results from the survey are charted below.



The answers had a wide range however, as indicated by the survey average, houseflies, mice and wild birds are the most difficult pests to control. Follow-up with producers as well as limited field testing last summer indicate that fly baits are not performing. Producers also feel that perhaps the rodenticides and fly sprays are less effective than a few years ago; this is a subjective determination.

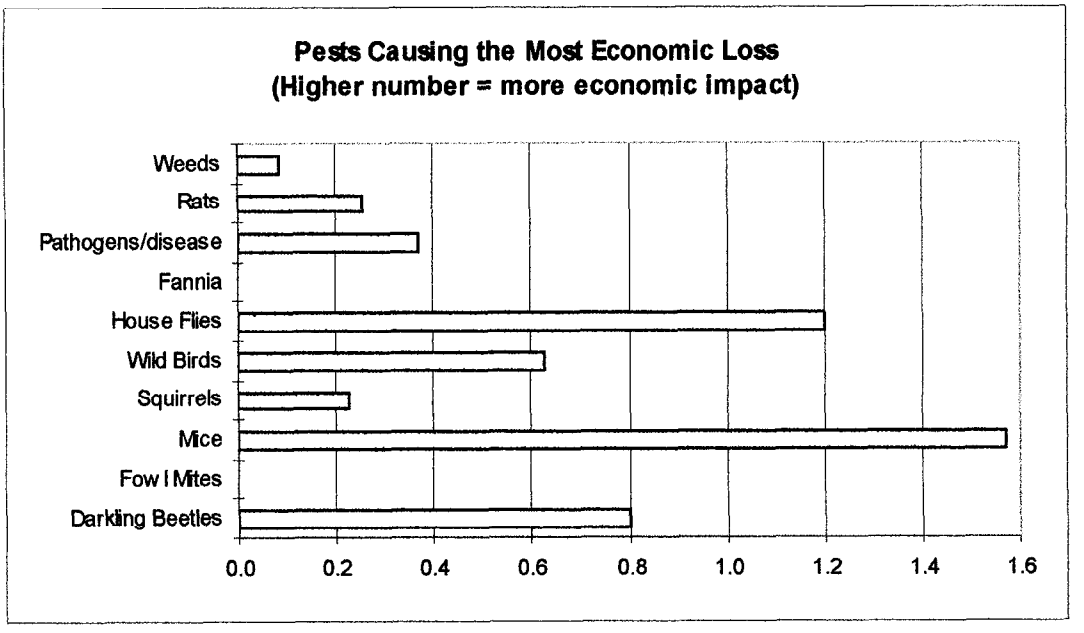
Northern fowl mites may look relatively unimportant, however, it has become the number one pest of turkey breeders. This is an obligate ectoparasite which is only a problem on mature birds and which is spread through wild birds, equipment or people. Explosions of this pest on both toms and hens result in reduced sperm or egg production due to severe dermatitis and irritation. This pest can also cause irritation and allergic reactions in people handling eggs or birds infested with these mites. They are now resistant to all available materials: Sevin, Rabon, Ravap, and permethrin.

Fannia or smaller housefly is primarily a pest of breeders and is extremely difficult to control. This species breeds in the same habitat as house flies but is considered a cool season fly in that it peaks in the spring and fall. We have two species, F. cannicularis and F. femoralis. The females and males circle lazily in the entryways of buildings and under eaves and near by trees. When present, this is the most difficult fly to control since we have no attractants and the males and females rest in different locations on a farm.

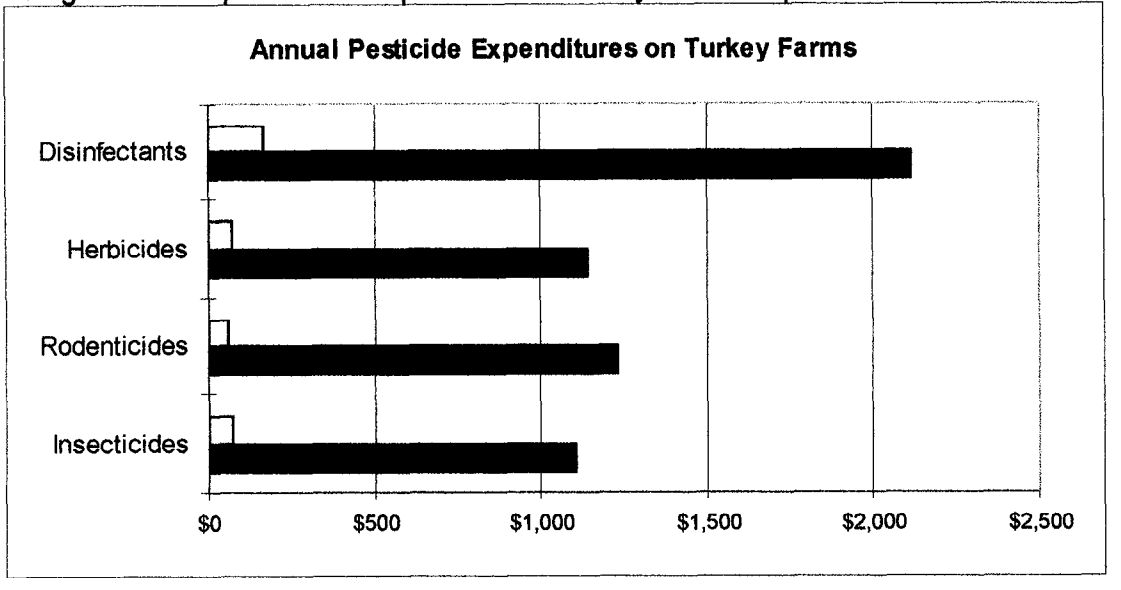
The respondents consider pathogens, weeds, and other pests relatively less difficult to control than mice, birds, and houseflies.

The same pests which were difficult to control also were of the most importance economically. This is in contrast to a survey three years ago where respondents indicated that pathogens are their number one concern, mice, wild birds, and rats come in a distant second, third and fourth. This may be due to the increased exposure in the literature and professional meetings where the roles of

these vectors in disease transmission has been stressed.



The average annual expenditures for pesticides on turkey farms are presented in the chart below:



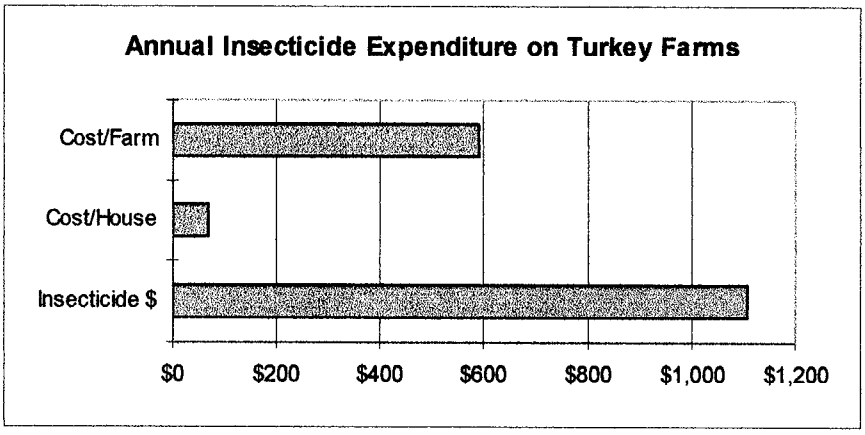
The average annual costs were:

	Annual Cost	Cost/House	Cost/Farm	Cost/Acre
Insecticides	$1,108	$69	$590	
Rodenticides	$1,231	$59	$531	
Herbicides	$1,141	$72	$647	$17
Disinfectants	$2,118	$165	$994	
Total	$5,597	$365	$2,761	

IV. CURRENT INSECT PEST MANAGEMENT PRACTICES

We asked our producers to list the insecticides, the frequency of the insecticide treatment, alternative fly management methods and how much they spend on fly control.

The annual expenditure for insecticides on turkey farms was obtained from 35 producers who represented 78 farms with a combined total of 506 houses. They spent an average of $1,108 annually. Each house averaged $69.



Producers were asked to list the products they used. A summary of the chemical classes represented are:

Insecticide	Fly Bait	Pyrethroid	OP	Other
Number of Respondents Reporting Use	24	23	5	8

37 out of 46 of our resondents used fly bait which was most heavily used in the summer and fall months. It was not possible to calculate either bait volume or the active ingredient of the sprayed products.

Several noted that neither the fly sprays nor the baits appeared to be working on flies.

Nonchemical methods of control utilized by our respondents were: Fly bottles: 61%, Fly tape 11% and Tilling the litter 74%.

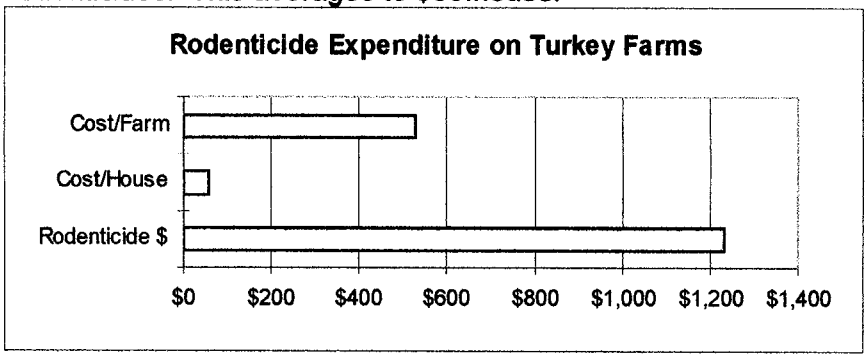
V. CURRENT RODENT MANAGEMENT PRACTICES

The survey questioned the producers about the rodenticides they used, the quantity, how many times they treated and any other rodent control methods they employed.

89% of this group used rodenticides continuously. The predominant class was anticoagulants (87%) with someuse of nonanticoagulants also represented (13%).

89% of the respondents also used weed control, 9% used live traps and 26% used guns to help control their rodents.

Thirty five producers representing 97 farms with 503 houses reported spending an average of $1231/year on rodenticides. This averages to $59.house.



VI. CURRENT WEED MANAGEMENT PRACTICES

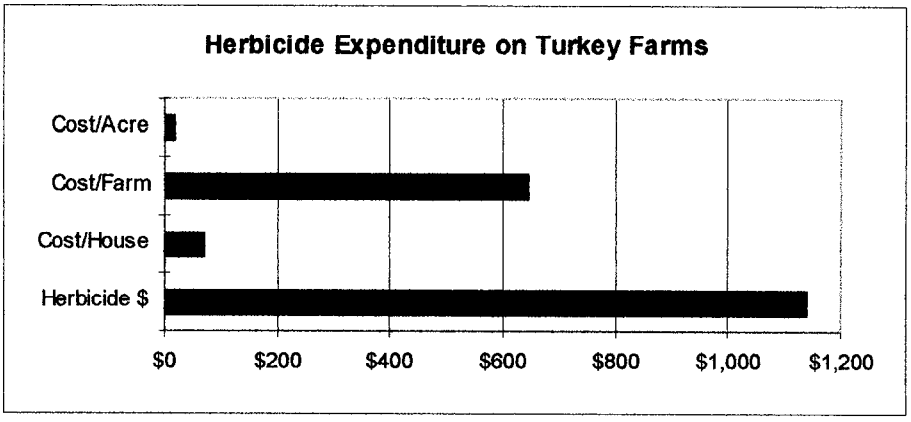
This industry uses herbicides to clear the ground around the farm which reduce and discourage rodent, fly and other vertebrate pests as well as eliminates the need to mow. We asked what herbicides and alternative weed control methods are being used, when and how frequently.

Roundup was used by 91%, Oust 13% , Diuron/Direx 17% and Goal 28%.

Of particular interest because of ground water and surface water issues is the use of diuron herbicide. This product was routinely combined with Simazine until ~2 years ago when the later was removed from noncrop use. It is now applied with Oust at rates between 3-5 lbs/acre. Goal is a diphenyl ether compound that is generally used alone.

Our producers also till (37%), mow (52%), disc/scrape (17%) and hoe (11%) to help control their weeds.

Thirty eight producers reported on herbicide costs. They represent 100 farms with a total of 544 houses on 8827 acres. They spent an average of $1,141/year. This averaged to $72/house or $17/acre.

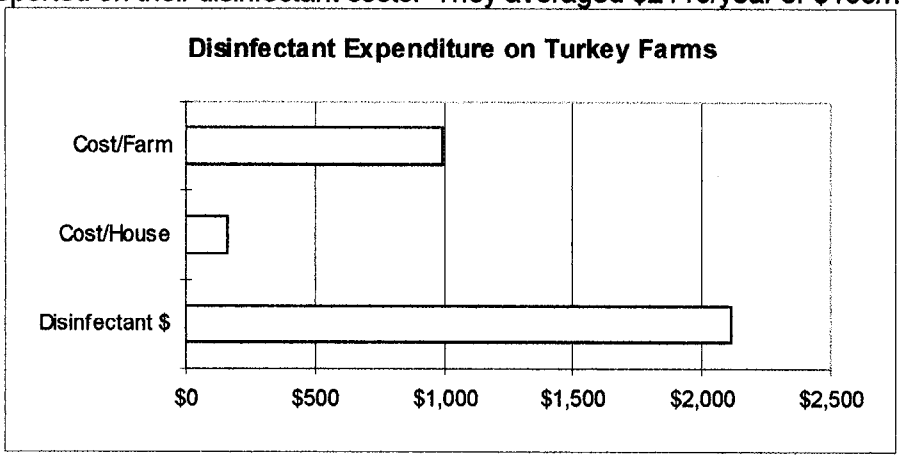


VII. CURRENT DISINFECTANT PRACTICES

We asked our producers which disinfectants they used on their farms. The most frequently mentioned product was Advantage 256 (61%). Other products were LPH (44%), P1420 (44%), Phenolics (20%), Iodines (28%), and Quaternary ammoniums (15%). Formaldehyde was

mentioned by only one producer.

Disinfectants are often purchased by the Integrated Poultry companies for their independent contractor. This decreased our producer input in that only 25 producers representing 68 farms with 356 houses reported on their disinfectant costs. They averaged $2118/year or $165/house.

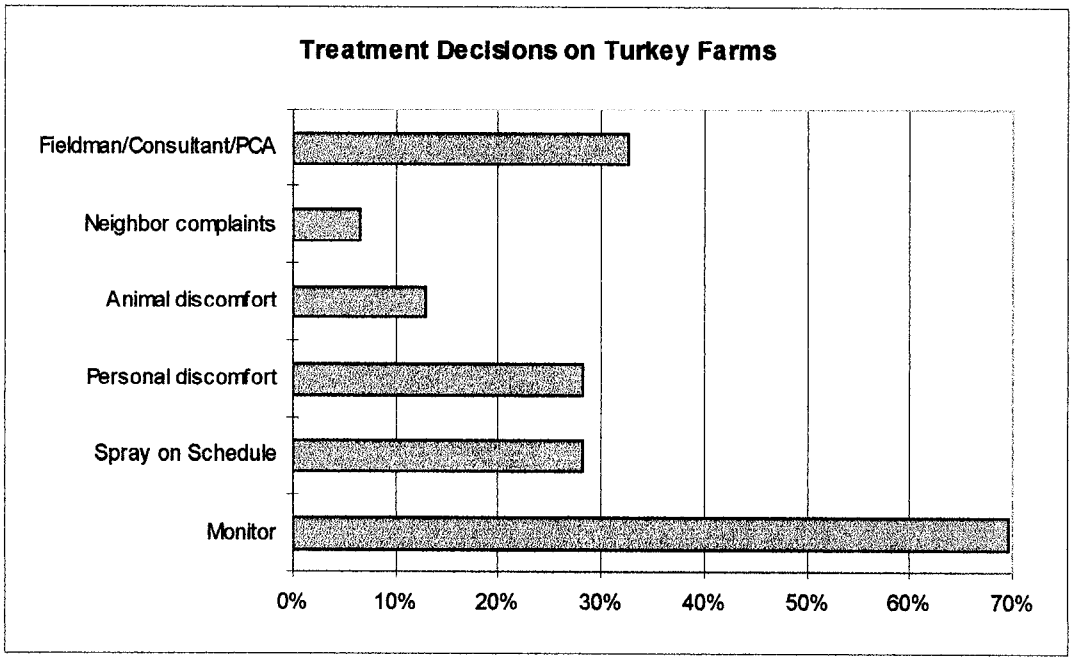


VIII. CURRENT PEST MANAGEMENT PRACTICES FOR WILD BIRDS

We gave our producers a list of options for managing wild birds which included bird balls, bird netting, live traps and others. 26 percent said they used bird netting, 13% a gun, 13% "chased them out" , 9 % bird proofed their farm and 6% used baits or repellents.

IX. TREATMENT DECISIONS

We asked our group how they made their decisions to treat for pests and listed a few options.



Personal observations were cited by 91% of the respondents as the tool they used to monitor. They also used fly bottles (48%) and fly tape (4%).

X. INNOVATION

This evaluation is innovative in that we examined all the pests encountered during poultry production and how farm management impacted both their individual populations and their collective populations. These pests overlap in their habitat and chronology and do have economic impacts on the cost of doing business. We are unaware of another industry that depends on so many of the compounds under regulatory review and whose ability to conduct a profitable enterprise would be significantly impacted by loss of these products. We have also documented the availability of options for the aforementioned areas some which require demonstration, others which require more in depth evaluation.

The survey results indicate that our industry is sensitive to several areas of regulatory concern: FQPA fly baits and fly sprays, heavy use of antimicrobials, diuron environmental issues, and protection of endangered species. The options available include:

1. Alternatives to methomyl fly baits or reducing the amount of fly bait
   a. The use of mechanical devices can solve two problems: they literally remove flies from the environment and they can be used as monitoring tools. The use of these has not been fully investigated on fryer and turkey farms although limited studies last year indicate high probability of success by using fly bottles on these farms.
   b. Parasites have shown to be very effective in layer farms; however, have not been investigated as tools for meat bird farms. The recent gregarious species combined with a solitary species would make an ideal combination for investigation on these farms.

3. Alternatives to diuron herbicide or reducing diuron usage
   a. Some fryer and turkey farms are barren of all vegetation. Instead of routinely applying herbicides on an annual basis, it is likely that these treatments could be done every two years.
   b. Alternative herbicides such as oxyfluorfen, norfluazon, and prodiamine are available and should be demonstrated to the growers.

4. Reducing the potential for rodenticide resistance and exposure of endangered species
   a. A system to monitor rodents would provide a tool whereby growers would not need to leave bait out continuously. This record keeping would also alert companies as to the effectiveness of their current management program and the need to rotate bait chemistries. Rodent monitoring tools such as live and snap traps serve dual purpose by eliminating the pest as well as documenting rodent activities. These techniques have not been developed in this industry.
   b. Published literature states unequivocably that it is impossible to eliminate rodents by just baiting. Demonstrating the concurrent use of multiple rodent management tools incorporating weed control, live/snap traps, tracking powder and bait pellets and blocks would increase rodent control on the farms and reduce bait use and dependence.

XI. PEST MANAGEMENT CHALLENGES

The challenges that this industry faces are the following:

1. There are no economic thresholds for any of our pest species

2. There are misunderstandings about some of the alternative methods available for pest management which can be ameliorated through demonstration, education and outreach programs.
3. There is high likelihood that some pest species will become resistant to the pesticides commonly used such as fly baits, darkling beetle products, and anticoagulant rodenticides.
4. There is a significant pressure to develop programs for pest management in this industry due to HACCP and other food quality programs.

XII. EXHBIT: CPF cover letter and the survey

CALIFORNIA POULTRY FEDERATION

3117-A McHENRY AVE.
MODESTO, CA 95350
PHONE: (209) 576-6355
FAX: (209) 576-6119
WWW.CPIF.ORG

February 18, 2000

Dear Turkey Producer,

The California Turkey Pest Management Alliance was successful in winning a contract with the California EPA Department of Pesticide Regulation (DPR) to assess the potential economic impact of the Food Quality Protection Act and other regulatory issues on the turkey industry if certain products become unavailable. The alliance is sponsored by the California Poultry Federation, the University of California Cooperative Extension and AgriLynx Corporation and is open to all interested parties.

Your input is important to this effort and will set the stage for future work plans which may be funded by DPR to develop alternatives to pesticides under review. We are currently at risk of losing several compounds that are used in fly baits, fly sprays, darkling beetle treatments, weed control and disinfection. We will also use this information to design and implement education and outreach programs. A similar alliance for the California fryer industry in 1998 qualified for $99,600 in DPR funding for demonstrating programs which have demonstrated economic savings and benefits for our producers.

All responses will be kept confidential. A final report will be published in the California Poultry Federation (CPF) newsletter.

Please take a few minutes to answer this brief survey. FAX returns to The California Poultry Federation (209) 576-6119 or return it to your Company flock supervisor.

Thank you very much for your time and support!

The California Turkey Pest Management Alliance

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BILL MATTOS, CALIFORNIA POULTRY FEDERATION - PRESIDENT






California Pest Management Survey for Turkey Producers

#	Question	Response
1	Which pests are the most difficult to control on your farm: (1= most difficult to control, 10= easiest to control)?	_____Darkling Beetles _____House Flies _____Fowl Mites _____Fannia _____Mice _____Pathogens/disease _____Squirrels _____Rats _____Wild birds _____Weeds _____Others(write in)_____
2	Please list the pests, in order of their importance, which cause the most economic loss to you. (Consider all factors including bird quality, building damage, disease transmission, public nuisance complaints, etc)	
3	What insecticide sprays and baits do you use for FLIES?	
4	How many times per year do you treat for FLIES?	Sprays/fogs_____ Bait_____
5	What other methods do you use for reducing flies?	Fly bottles Fly tape Fly parasites Electric zappers Tilling litter Other_____
6	How much do you spend on fly control every year?	
7	What RODENTICIDES do you use?	
8	How often do you bait per year?	
9	What other methods do you use for reducing/eliminating rodents?	Weed control Live traps Gun Cats Other_____
10	How much do you spend on rodent control each year?	
11	What HERBICIDES do you use?	
12	When do you apply herbicides?	
13	What other methods do you use for eliminating weeds	Tillage Mowing Other_____
14	How much do you spend on herbicides each year?	
15	What DISINFECTANTS do you use for disinfecting the houses between flocks?	

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16	What disinfectants do you use for other uses such as foot baths?	
17	How much do you spend on disinfectants each year?	
18	What do you use for reducing/elimination WILD BIRDS on your farm?	Bird balls Bird netting Live traps Repellents Other_____
19	How do you make your decisions to treat for pests? (Circle all that apply)	Monitor Spray on a schedule Personal discomfort Animal discomfort Neighbor complaints Consultant/PCA Other_____
20	If you monitor, what monitoring tools do you use? (Circle all that apply)	Fly tape Spot Cards Personal observation Fly bottles Neighbor complaints Other_____
21	In your opinion, what is your most serious concern about controlling the pests on your farm?	
22	How many farms are you responsible for?	
23	How many acres does your farm(s) cover?	
24	How many production buildings are on your farm(s)?	
25	Where do you get your information on pest control? (Circle all that apply)	PCA Cooperative Extension Veterinarian Flock supervisor Ads Neighbors Ads Other_____
26	What sources and types of information would help you manage your pests more effectively? (Circle all that apply)	Internet web site for poultry pest information Pest Information Bulletins Presentations at CPF meetings Weekly/monthly information in the CPF newsletter Other_____
27	Would you be interested in participating in a research program to evaluate and demonstrate monitoring and management methods for turkey pests?	Yes No
28	If your answer to question 26 is yes, please write your name and phone number in the box to the right.	
29	Please write any comments or observations you have on the challenges of managing pests on turkey farms.	

THANK YOU!